

1                   THE EMBODIMENTS OF THE INVENTION FOR WHICH AND  
2 EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS  
3 FOLLOWS:  
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5                   1.     Apparatus for treating a gas stream containing liquid and being  
6 adapted to a vessel having cylindrical side walls, a bottom end, and a tangential gas  
7 inlet adjacent a top end, the apparatus comprising:

8                         a base plate positioned below the tangential gas inlet;

9                         at least one cylindrical shell arranged on the base plate and adjacent  
10 the wall portion for forming at least one annular cavity extending upwardly from the  
11 base plate and having an open end for receiving liquid therein;

12                        an opening in the base plate at each annular cavity for draining liquid  
13 from the at least one annular cavity;

14                        an outlet for the gas stream positioned adjacent the base plate and  
15 within the annular shells; and

16                        a plate above the gas outlet for directing the gas stream over the one  
17 or more annular cavities before a drier gas stream is removed through the gas  
18 outlet.

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20                   2.     The apparatus of claim 1 wherein the base plate divides the  
21 vessel into an upper gas cyclonic separation portion above the base plate and a  
22 lower liquid storage portion for receiving liquid from the one or more openings in the  
23 base plate.

1                   3.     The apparatus of claim 1 wherein an annular cavity is formed  
2 between the vessel side wall and one of the at least one cylindrical shell.

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4                   4.     The apparatus of claim 3 wherein there are two or more  
5 cylindrical shells, one within another, and being spaced successively and radially  
6 inward from an outermost cylindrical shell to an innermost cylindrical shell and  
7 forming annular cavities therebetween.

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9                   5.     The apparatus of claim 4 wherein each radially inward and  
10 successive shell has a lesser height.

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12                  6.     The apparatus of claim 1 further comprising an annular blanket  
13 adjacent the side walls and extending for at least a portion of the side walls between  
14 the tangential gas inlet and the open end of at least one cylindrical shell.

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16                  7.     The apparatus of claim 1 further comprising a conduit  
17 extending from the gas outlet for directing the drier gas stream out of the vessel.

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19                  8.     The apparatus of claim 7 wherein the conduit extends along an  
20 axis of the vessel and directs drier gas stream out of the top end of the vessel.

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1                   9.     The apparatus of claim 8 wherein:  
2                   the conduit has a top end suspended from the top end of the vessel;  
3     and  
4                   the base plate is suspended from a bottom end of the conduit.

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6                   10.    The apparatus of claim 9 further comprising:  
7                   an insert for the vessel, the insert comprising the conduit, base plate  
8     and cylindrical shells arranged thereon.

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10                  11.    The apparatus of claim 10 wherein the insert further comprises  
11     an annular blanket adapted for residing adjacent the side walls and extending for at  
12     least a portion of the side walls between the tangential gas inlet and the open end of  
13     at one least cylindrical shell.

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15                  12.    A treatment vessel having cylindrical side walls, a bottom end,  
16     and a tangential gas inlet adjacent a top end and having the apparatus of claim 1  
17     arranged therein.

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1                   13. Apparatus for treating a gas stream containing liquid  
2 comprising:

3                   an insert adapted for installation into a cylindrical vessel having a  
4 bottom end and having a tangential gas inlet adjacent a top end for spinning the gas  
5 stream, the insert having a bottom end and a top end;

6                   a base plate at a bottom end of the insert;

7                   one or more cylindrical annular shells arranged on the base plate, the  
8 first of the shells positioned adjacent the vessel for forming at least one annular  
9 cavity extending upwardly from the base plate for receiving liquid therein;

10                  one or more openings in the base plate at each annular cavity for  
11 draining liquid from each annular cavity;

12                  an outlet for the gas stream positioned adjacent the base plate and  
13 within the annular shells; and

14                  a plate for directing the spinning gas stream over the annular shells  
15 before a drier gas stream is removed through the gas outlet.

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17                  14. The apparatus of claim 14 wherein the base plate divides the  
18 vessel into an upper gas cyclonic separation portion above the base plate and a  
19 lower liquid storage portion for receiving liquid from the one or more openings in the  
20 base plate.

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22                  15. The apparatus of claim 14 wherein the insert further comprises  
23 a conduit extending from a top end of the insert to the bottom end of the insert.

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16. The apparatus of claim 15 wherein the conduit extends along an axis of the vessel to the top end of the vessel for directing a drier gas stream out of the vessel.

17. The apparatus of claim 16 wherein:  
the conduit is suspended from the top end of the vessel; and  
the base plate is suspended from a bottom end of the conduit.

18. The apparatus of claim 14 wherein there are two or more cylindrical shells, one within another, and being spaced successively and radially inward from an outermost shell to an innermost shell and forming annular cavities therebetween.

19. The apparatus of claim 18 wherein each radially inward and successive shell has a lesser height.

1                    20.    The apparatus of claim 14 wherein the insert further comprises  
2    an annular blanket adapted for residing adjacent the side walls and extending for at  
3    least a portion of the side walls between the tangential gas inlet and the open end of  
4    at one least cylindrical shell.

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